

From: Don Zylstra
Sent: Thursday, June 10, 2004 2:41 PM
To: Dabbs, Paul
Subject: Comments on Draft

In regards to the *Draft* California Water Plan, and the use of power plant ocean outfalls for discharge of desalination brines, I have the following comment:

The disposal and discharge of collected brines from both desalination of groundwaters and ocean waters present one of the largest challenges facing California for implementing desalination processes. The analysis contained in the draft work plan both drastically under analyzes and oversimplifies the issue. Most power plant ocean outfalls are located at shallow ocean depths, are vertically jugged, and consist of just a large open pipe. These are not usually designed with diffusers that are typically installed in municipal POTW ocean outfalls. The power plant outfalls were designed for once-through cooling systems and essentially are designed for the discharge of just ordinary seawater. Therefore, there is very little dilution offered (Dm's may range from 5 to 10 for example). The dilution consists of momentum induced mixing as the effluent jets vertically. The plumes generally reach the surface very quickly due to the shallow depths, and at the surface dilution continues via radial jet mixing.

This produces another problem, in that none of the public domain modeling systems incorporate the radial jet mixing as part of the dilution calculation, so it is difficult to demonstrate the actual dilution to the State Water Resource Control Board and the specific Regional Water Quality Control Board. This is currently a topic of controversy within the SWRCB. The impact of the ability to properly calculate the actual dilution ratio, is the lack of ability to demonstrate compliance with the California Ocean Plan and its water quality objectives for the many contaminants of concern listed in the Ocean Plan. This in turn holds up the permitting process for the potential discharge of brines.

Ideally, brines may be best handled by processing them through municipal POTW's that are equipped with ocean outfalls designed with high dilution ratios. The dilution ratios of these outfalls are sometimes near 220:1. As more and more of these facilities employ tertiary treatment for the production of recycled water, they will require that brines introduced to their collection systems bypass the normal treatment system, so as not to add to the salt loading of the recycled water. This can be accomplished by the construction of specific brine collection pipelines, but this eliminates the potential for treatment that the collected brines would undergo for organic and inorganic constituents that may be present in the brines, like VOCs or nitrates. Therefore, the brines may require additional treatment facilities as well prior to discharge through these ocean outfalls.

The draft plan also did not mention the concern some environmental groups have over the discharge of super saline plumes into the ocean environment. Therefore, the disposal and discharge of the brines is a very complex issue and one we should definitely investigate in much more detail, to develop realistic methods for mitigating these environmental concerns and barriers.

Sincerely,

Don W. Zylstra, P.E.
Senior Engineer
Kennedy/Jenks Consultants

2151 Michelson Drive, Suite 100
Irvine, CA 92612-1311